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Local Actions, Global Visions: Remaking Environmental Expertise

Women, often ridiculed as “hysterical housewives,” recognize that environmental hazards are health hazards, and those hazards are killing children and others in our communities. It is no longer a question of how much pollution is acceptable; the demand is that there be no more pollution . . . Women have refused to play the game by the rules of the old environmental movement . . . the “environment” for women in our communities is the place in which we live, and that means everything that affects our lives. . . . For someone having to drink polluted water, ozone depletion is not an issue which ranks high. . . . For mothers of children dying from cancer, global warming is a non-issue. . . . The battle is for survival.—Penny Newman, “Killing Legally With Toxic Waste: Women and the Environment in the United States”

Women grassroots environmentalists from around the world insist that the struggle for environmental justice is a struggle for health—for the health of children, the health of workers, the health of poor urban and rural communities, and the health of the natural environment. They have begun to articulate questions of health in relation to both human communities and the nonhuman environment—in other words, they argue that the health of humans and the “health” of the environment are profoundly linked. This is an argument that forcefully challenges many traditional theories and methods for identifying and solving environmental problems that *separate* issues of human health and environmental degradation. The increasingly impassioned voices of women community activists, like Penny Newman’s, severely criticize the environmental consciousness underlying this historical separation and ask instead, “How are ‘nature,’ ‘the environmental,’ and ‘society’ interconnected and interdependent in our own lives?” Furthermore, grassroots activists question yet another division that is embodied in most environmental discourses and institutions, that is, the different valuation

and knowledge possessed by local communities versus those held by environmental scientists. Health and environmental problems are increasingly understood by activists and scientists alike as being global in scope. As such, these problems are represented as requiring international or transnational cooperation grounded in the exchange of knowledge, technology, and expertise. However, what counts as authentic, useful knowledge about environmental and health issues is contested by scientists, policymakers, environmentalists, and local communities. I explore how women activists from communities of color and low-income white communities in the United States and from different class and caste backgrounds in India critique the negative effects of dominant environmental and medical sciences, yet also develop new articulations of experiential, or “common sense,” *local* knowledge and experimental, or “scientific,” *universal* knowledge. The contemporary linkages being forged by women environmental justice activists in both the United States and India must be placed within a broader history of environmental discourse and practice (for example, in the context of Rachel Carson, Alice Hamilton, and the urban-based public and occupational health movements of the early part of the century) that also made these connections.¹ What is new about these more recent formulations, however, is their coupling of environmental health injustice with racial/ethnic and gender social categories and their explicitly tying of those categories to transnational political economic formations. Moreover, constructing these transnational linkages requires the invention of new local/global political strategies, identities, and meanings of commonly understood concepts such as “global,” “local,” “environment,” “health,” “justice,” and “scientific expertise.”²

In this essay, I examine a few specific examples of women activists’ local/global environmental struggles and alliances focusing on the articulation of a complex construction of environmental expertise. In both India and the United States, linking the local and the global in terms of common injury and common cause is seen as an important political strategy in women’s environmental justice struggles. In other words, women’s transnational alliances aim to develop feminist understandings of environmental health problems that are grounded in specific women’s experiences of environmental injustice, yet aim to show how these problems are globally interconnected. This essay discusses some translocal feminist-environmentalist inventions generating alternative forms of environmental expertise that focus on two interconnected strategies. One strategy concerns the issue of scale, and the second strategy involves the creation of a critique of dominant methodological and epistemological structures of scientific practice.

Thinking Globally and Acting Locally: Shifting Discourses of Environmental Problem Solving

One of the problems that inevitably arises when speaking about the history, practices, and strategies of local and transnational environmentalisms is the question of definition. What counts as environmentalism, how are environmental problems understood and by whom, and who should be determining the nature and severity of environmental problems (scientists, policymakers, local communities)? In terms of political strategy, another question of definition involves the issue of scale: Should environmentalism be rooted in the grassroots, that is, at the local level, or should it be global, therefore necessitating the creation of a complex structure of international bodies authorized to oversee these problems?

One of the most significant changes in western environmental thinking and acting was the shift in the early 1970s from the earlier belief that environmental problems were local or regional concerns relating to resource depletion, pollution abatement, and conservation priorities, to the current understanding of environmental problems as being global in scope. During the late 1970s and early 1980s, mainstream organizations and national governments increasingly relied upon the environmental sciences—ecosystem and community ecology, climatology, oceanography, etc.—to define key environmental problems. These sciences demonstrated that environmental problems respected no national borders and were more extensive, more systemic, more planetary, than any national government or local legislature could handle. The recent surge of the so-called “planetary sciences” calling attention to increases in greenhouse gases (carbon dioxide and methane), atmospheric ozone depletion, remote sensing images of rainforest destruction, deforestation due to acid rain, and climatological models predicting major shifts in future temperature and precipitation levels, have contributed to the perception that environmental problems have now become thoroughly global.³ Given the global scale of these problems, it follows that they require global technoscientific intervention and international political responses in order to limit their expansion.

The post-Stockholm era of environmentalism (the period after 1972, following the first United Nations conference on environment and development) is seen by many environmentalists as the originary moment of the emergence of the international awareness of environmental problems as global problems.⁴ Numerous scientifically grounded documents emerged after this early international conference and documented the massive scale of the global catastrophe that the earth was facing—including, among others, the strain on global carrying capacity by the rising human population, global warming, stratospheric ozone

depletion, massive deforestation and desertification, and the widespread loss of biodiversity and habitat.⁵ The conjoining of all of these problems was later referred to as “global environmental change,” and it remains today the primary focus of most western-based international environmental organizations.⁶ But, could environmental problems of such global scale be addressed by activists who may be grounded in a localist, community perspective?

Also in the late 1970s and 1980s, at the same time that the focus of many international environmental organizations was on reducing “global environmental change,” grassroots organizing efforts in the United States and in many other countries were focusing on threats to community health and livelihood resulting from exposure to toxic chemicals, pesticides, and nuclear wastes, and from land displacement due to large-scale development projects, resource extraction (for example, uranium mining on Native lands), and the siting of military installations. How do the theory and practice of these grassroots environmentalists confront the national and international agendas of environmentalism, and how do they respond politically to the shifting conceptualization of environmental problems as global problems?

In the United States, the grassroots groups that are demanding greater participation in the framing of environmental debates, arguing for more critical attention to racial and class inequalities, generally identify themselves as being part of the environmental justice movement (EJM), a network of local and regional organizations, largely populated by women of color and low-income white women, that focus on corporate and government indifference to the health and sustainability of minority and poor communities.⁷ In India and many other developing nations, environmentalism has historically focused on social justice issues relating to questions of colonial or neocolonial destruction of land, resources, and livelihood. Moreover, in India, more explicitly than in the United States, many women activists explained to me that they define all environmental problems as women’s problems. This, many argued, was due to the historically and culturally constructed sexual division of labor that places the responsibility of community health and survival primarily in the hands of women.⁸

One of the interesting transformations in the agendas of these grassroots groups is that many have evolved from defending a localized “place” orientation, sometimes termed NIMBYism (Not In My Backyard), to supporting a broader, or more universal concept of environmental justice. Many groups have begun to understand themselves as being situated in a global culture that is indeed experiencing global environmental change. However, what counts as global environmental change is often represented differently from that espoused by mainstream or elite sites of environmental discourse. For example, biodiversity and habitat

destruction are also cited as serious problems by many environmental justice activists, although in different terms, but not because of the alleged reduction of the genetic wealth propelling the natural processes of evolution or the squandering of the potential pool of future resources and commodities.⁹ Many Native American environmental justice groups and numerous indigenous rights groups in India focus on how the destruction of nature limits their ability to secure sustainable livelihoods and devastates particular landscapes or nonhuman species considered sacred or important to their culture's way of life. Also, farmers' organizations in India struggle against global environmental change by confronting intellectual property rights law, which guarantees transnational corporations such as Cargill the right to patent cash-crop seed varieties at the expense of local farmers' rights to produce their own seeds and to cultivate and sustain native plant species.¹⁰ These are different conceptions of the problems associated with global environmental change.

Translocality in Grassroots Environmentalism

Strategies employed by many grassroots environmental groups to address global environmental change tend to concentrate on developing webs of local organizations or building translocal environmental alliances among diverse communities suffering similar problems, rather than on establishing international institutions.¹¹ In the case of many of the groups I studied in India and the United States, translocality included not only efforts at bridging racial, ethnic, religious, or caste differences, but also attempts to engage in conversations across layers of environmental expertise—particularly among the different forms of expertise held by environmental scientists, policymakers, legal experts, *and* community people. In this sense, the discursive formations and communities of practice concerned with global environmental change that are represented by grassroots activists in both countries can be understood as “networks with multiple agents and sites where knowledge is produced, contested, utilized, and transformed.”¹²

This translocal network-building strategy often occurs through what Mary Louise Pratt has called “contact zones,” what she refers to as those sites of colonial and neocolonial encounters in which people who have been geographically and historically separated come into contact with one another and establish ongoing relations.¹³ These historically shifting landscapes of different human populations can bring people together who may be as disparate as local villagers displaced from World Bank dam projects, nongovernmental organization (NGO) participants at United Nations conferences on environment and development, or immigrant and refugee antitoxics activists who find themselves living and working side-by-side in large global cities such as Los Angeles. Clearly, these contact zones

often indicate new sites of neocolonialist expansion and often generate interethnic violence and various fundamentalisms. However, they also signify possible sites of resistance and intercultural collaboration.

One notable example is the case of environmental justice activist Penny Newman, a working-class white woman from Riverside County, California, who traveled to India to participate in an international conference on women, ecology, and development. In India, Newman shared her experiences of women-led grassroots political organizing against an illegal toxic waste dump in a low-income region of southern California. At the conference, convened in Bangalore in 1991, women activists and scholars from the United States, Thailand, India, Pakistan, Malaysia, Sri Lanka, and the Philippines shared their experiences of environmental and social injustice. Many of the women participants have since become NGO representatives at United Nations conferences, such as the Women's Conference in Beijing. This intellectual sharing by both activists and scholars from different parts of the globe represents what Inderpal Grewal and Caren Kaplan call "transnational feminist practices."¹⁴ These are intellectual and political practices that acknowledge transnational cultural, economic, and epistemic flows in order to better understand the material conditions that structure women's lives in diverse locations. Only by understanding the specific variances in material conditions, they argue, will feminists be able to construct effective oppositions to current economic and cultural hegemonies that have taken on new global forms. The contact zone opportunity that materialized at the conference in South India catalyzed some preliminary conversations on the process of constructing transnational feminist environmental politics.

Newman's contact zone experience resulting from this conference encouraged her to initiate a local/global activist project in the Los Angeles area. In 1993 she founded the Center for Community Action and Environmental Justice (CCA EJ) to bring attention to the increasing transnationalization of industrial production and waste management. To develop alliances with the large Asian immigrant population in the Los Angeles area, CCA EJ focused on the political ecology of the global waste and "recycling" trade, which includes the dumping of recycled lead batteries and plastics in numerous Third World Asian countries.¹⁵ CCA EJ's activism points to the local and global effects of environmental racism and industrial production, bringing together many local groups that would not ordinarily identify political commonalities.

Part of the process of imagining a transnational community committed to local activism, according to activists I spoke with, was the *exchange* of grassroots knowledge and expertise about social and environmental concerns. The new forms of transnational environmental expertise that women activists produce, therefore,

incorporate a strong *syncretic* impulse—that is, they appropriate and fuse multiple forms of scientific expertise, both elite and locally generated.

For example, AIKYA (or “coming together”) is an organization located in Karnataka that works to build multicaste and multiethnic communities concentrating on gender, health, environment, and development issues. Members of the organization construct diverse forms of environmental expertise by drawing from western science *and* traditional Indian models of health care, agriculture, and community development. The AIKYA philosophy is also directed toward imagining and constructing new “mixed communities” in which identity would not simply be founded on sameness. AIKYA activists (most often from upper-caste backgrounds) organize mixed community events, often bringing together poor Muslims and low-caste Hindus from impoverished villages who had never once spoken to each other. Initially, the barriers are broken by the different parties agreeing to eat together—a cultural taboo in many parts of India. Following these sorts of transcommunity encounters, village members and activists then begin to discuss commonalities and differences relating to women’s health problems, economic development, and environmental deterioration.¹⁶

Because these translocal and transnational networks often draw upon multiple forms of environmental expertise—from both elite and community knowledge bases—they bring differently located actors together, prompting a challenge to traditional hierarchies of expertise. Such linking, or hybridization, of diverse knowledge regimes may call into question issues of epistemological legitimacy and, furthermore, may generate newly configured sites of environmental contestation.

Who Speaks for the Health of the Planet?: Contesting for Environmental Expertise

The pursuit of the transnationalization and democratization of environmental expertise is not an uncomplicated project. Environmental justice activists and scholars from many different countries often encounter barriers and resistances to their contributions to knowledge about environmental problems. Although in the United States the National Environmental Protection Act (NEPA) has a citizen participation clause encoded in it, there are few opportunities for ordinary citizens to evaluate and contribute to decisions about science and technology directions relating to environmental protection and environmental health.¹⁷ Moreover, there is a recent perception within academic and some mainstream environmental circles that the support of ordinary people’s access to and involvement in debates on environmental problems and ecological science is simply maneuvering on the part of academic deconstructionists who want to “redefine

the concept of living nature and its protection as part of the struggle to liberate the less powerful classes of *Homo sapiens*.”¹⁸ Others have suggested that the current popular trend toward environmental justice and multiculturalism portends the “demise of the ecology movement.”¹⁹ What this dispute turns on is the assertion that legitimate scientific knowledge about the environment is exclusively located within certain communities of credentialed experts. It seems that there is a significant debate underway around the concept of what counts as environmental expertise and who can and should inhabit the identity of the legitimate expert.

This gets at the heart of what I believe to be one of the problems facing activists and scholars who are interested in confronting current global socioenvironmental crises. Who should be authorized and entrusted to speak on and make claims about and for “nature,” “the environment,” and “society”? How do we marshal different groups’ and cultures’ best knowledges and efforts at understanding and solving these problems? What are the stakes involved in the desire by some to reassert the expert/nonexpert, scientist/layperson divides in discussions of science, health, and environment? And what are the possibilities for productive partnerships among a multiplicity of interested actors and groups—both experts and not? I have been arguing that from grassroots environmental movements a new species of “expert” has emerged—one that is constructed from the everyday struggles of people striving to understand and negotiate their needs and desires in efforts to live a decent life. For example, women activists in India and the United States use common sense knowledge to challenge the standard analyses of scientific research; incorporate experiential knowledge in scientific practices and processes; point out some scientists’ complicity with national and corporate interests that cause environmental degradation; and develop new community-based tools of research. This new species of ordinary expert, previously excluded from discussions on scientific, medical, and environmental matters, will increasingly have something to say about the current state of nature and its protection—but the question is, should this intermingling be regarded as a threat as some scientists and environmentalists imply?²⁰

The Critique of Science from the Margins: “Ordinary” Women and Environmental Action

The cultural theorist Raymond Williams has made the argument that culture is best understood within the realm of the “ordinary.” Culture should not be seen only as that represented in museums or the opera, but in garage sales, MTV, and in the muddling through of life’s daily struggles.²¹ Historically, at least since the advent of the era of professionalization in the nineteenth century, applying this

formulation to the sphere of science and technology would be considered anathema. Culture, with its excess of biases, perspectives, lenses, and misleading subjectivities, is impossibly overdetermined and precisely that which has (or should have) been assiduously expunged from the domains of science and technology.

Critical and historical studies of science and technology, or “STS,” have for many years demonstrated the fallacy of this notion. Writers in the field of science studies have argued that science and technology, like any cultural formation, are socially and culturally shaped, negotiated, and constructed and must be understood within particular historical, geographical, ethnic, linguistic, national, and global configurations. A growing body of science studies scholarship directs its attention to the *practices* of scientists themselves, and not primarily to analyses of the epistemological, philosophical, or ideological underpinnings of scientific theories and ideas.²² The majority of these studies, however, persist in locating the significant *action* of science and technology almost exclusively within elite sites of its articulation and production, that is, in the laboratory, the university, and in the words and practices of its experts.²³ However, what if we reconceptualize the identity of the expert by taking into account the construction and critique of scientific and environmental expertise by women activists?²⁴

The experiences, lived realities, and understandings of science and technology described by women activists, particularly marginalized women activists, reveal very different relationships to knowledge about environmental and health problems, and their potential solutions. How different women live with, adapt to, rework, and transform the scientific knowledges and technologies that they encounter have the effect of producing new forms of science, technology, and knowledge in general and, in the process, new scientific agencies. These new scientific agencies, or new versions of expertise, develop from the articulation of local and global forms of knowledge and generate new, potentially interesting research questions grounded in critical social and environmental problems. Therefore, the cultural and material effects and reconstructions of science and technology can be found in multiple locations, both elite and ordinary.

I also draw upon the insights of two feminist science critics, Sandra Harding and Susan Leigh Star, to think about ways of understanding the specific contributions to reconstructions of technoscience that may emerge from “standpoints from the margins.” Feminist philosopher Sandra Harding has written extensively on the subject of feminist standpoint theory. A feminist standpoint, derived from critical reflection on experience, functions both to deconstruct the “god trick”²⁵ version of scientific objectivity and to construct a better, feminist-oriented version that she calls “strong objectivity.” A feminist standpoint, as opposed to simply women’s perspective, Harding explains, is an achievement developed through critical social and historical analysis inside of and among different

feminist political struggles. For example, women's experiences of gender differences in response to environmental deterioration, subjected to critical reflection, may evolve into a feminist-environmentalist standpoint, which could develop situated knowledges about means to improve the conditions of the local environment. In her important theorization of starting research projects from the standpoint of women's lives, Harding is less attentive to how experiences of oppression and marginalization are different for women located differently by class, caste, race, ethnicity, nationality, and geography. To avoid the problem of positing a *universal* feminist standpoint, the question must always be asked, "starting from *which* women's lives?" For example, how do different women experience gender, racial, and class discrimination in their struggles for environmental justice?²⁶

Sociologist Susan Leigh Star uses the concept of the experience of fitting or not fitting into processes and structures of standardization to analyze people's responses to technoscience. Fitting or not fitting into society's "technologies of Standardization" produces "split selves" or "cyborg" identities, which afford different people different lenses onto questions about power in science and technology. Like Harding, Star suggests that formulating questions and starting technoscience projects from the standpoint of the "voices of those suffering from abuses of technological power" will result in more powerful analyses. Unlike Harding, Star shows that by examining questions of "fit" in technological society, we can uncover the ways that we are in some instances marginalized while, in other instances, our own experiences of fitting in function to marginalize others. This helps us to understand that "we are all marginal in some regards, as members of more than one social world," and, according to Star, we are reminded that "[social relations] could have been otherwise." Indeed, the women environmental activists I spoke with insist that by incorporating the experiences of marginalized communities into research practices we are better able to see that social and environmental relations could be otherwise.²⁷

The everyday encounters with scientific rationality and technology in ordinary women's lives help to produce various theories and practices for actively improving the conditions of their local communities and environments. In contrast to some people's fears about the recent incursions of both academic humanists and the "less powerful and oppressed" subgroups of humans into the world of science and environment, I see these developments not as a threat, but rather as indicators of the possibilities and opportunities of a multicultural approach to the production of valuable environmental knowledges.

Popular Epidemiology as "People's Science": Articulating Local and Global Knowledge Systems

As I have been arguing, women activists' construction of environmental expertise is produced through the articulation of local and traditional scientific

knowledges. In part, as I discussed above, this occurs through activists addressing the question of scale by shaping translocal and transnational alliances that enable the exchange of critical environmental discourses and practices. Women activists also produce hybrid forms of expertise by developing critiques of the existing scientific paradigms that are in place in the environmental sciences, which are the sciences most often used to justify national and international environmental policy initiatives. This second approach—women activists’ critiques of environmental science and the construction of alternative scientific paradigms—is what I will focus on in the remainder of this essay.

Activists’ practical theories and critiques of scientific expertise in relation to health and the environment are produced in different ways. Some environmental activists dispute official scientific theories and research methods that they argue do not make use of appropriate data bases or that do not pose relevant questions. Others attempt to articulate different forms of expertise and to create alternative routes to knowledge devoted to solving environmental problems. This may include the development of alternative survey instruments, such as the “community health survey” or the establishment of nongovernmental community health clinics attempting to prefigure a more socially just health care climate. Both of these deconstructive and constructive approaches to building environmental expertise are components of the organizing work that U.S. and Indian women activists develop.

Many activists challenge what they perceive as the lack of “common sense” rationality underlying the research protocols of most statistically based environmental impact assessments. In their evaluation of technical documents, activists call into question issues of problem definition, study design, interpretation of findings, and policy implications. They insist on recognizing the authority of knowledges built on the experiential realities of those communities most directly affected by environmental problems. In other words, activists’ knowledge about the physical, bodily effects of toxins in their lives develops a form of popular science, or “popular epidemiology,” founded on a localized environmental standpoint epistemology. To use Harding’s formulation, our most strongly “objective” knowledge emerges when we clearly identify the standpoints, or locations, from where we are speaking and framing our questions.²⁸ In this sense, we can learn crucial information about the most serious effects of environmental problems by starting from the standpoints and lived realities of those most severely affected. This is a knowledge base that women activists argue has been disregarded in most environmental sciences; it is not viewed as valid knowledge.

Much of the literature documenting the historical phenomenon of marginalized actors entering into scientific debates on toxic contamination characterizes scientific

knowledge as a resource produced by and available to elites that laypersons attempt to mobilize in order to gain some legitimacy within environmental policy circles.²⁹ This version of resource mobilization theory still locates the site of knowledge production as outside of activists' territory. Activists' territory is that of the political, not the epistemological. This formulation reproduces the notion that grassroots activists merely reflect special interests and scientists value neutrality.

Some STS theorists, such as Helen Watson-Verran and David Turnbull, argue that the two knowledge systems, lay and professional, form epistemic assemblages that should be seen as interrogating one another rather than as representing the opposition of political interests on the one hand and objectivity on the other.³⁰ Traditionally, the merits of local knowledge (ethno- or community-specific), which is represented as utilitarian and value-laden, have been judged against western science (universal knowledge), which is taken as definitional of rationality and objectivity. This has habitually positioned local knowledges as inferior. According to Watson-Verran and Turnbull, the divide between the two knowledge systems is suffused with unequal power relations, not actual differences in the objectivity or systematicity of the knowledge produced. They write:

We need to recognize that "systemic discipline" and "local resistance" are two sides of the same coin; promoting systematicity is a local practice, and local resistance contains the impetus for systematization. If we do not recognize this joint dialectic of the local and the global, we will not be able to understand and hence establish conditions conducive to the possibility of directing the circulation and structure of power in knowledge systems, conditions for promoting redistributions.³¹

The interrogations of the environmental sciences undertaken by environmental justice activists, therefore, should be understood as doing science, but from a different knowledge system. Watson-Verran and Turnbull argue that:

Analysis and critique of scientific knowledge, whether from the point of view of contesting knowledge systems, or any other, is part of science. In carrying out our endeavors, we are obliged to ask: What sort of politics do we want to characterize our knowledge systems? Part of the reason that it is important to identify the established assemblages of practices through which a knowledge system works is to be in a position to infer the forms of association and hence power relations they engender to make it possible to look for ways of remaking them.³²

Environmental justice activists' interrogations of official scientific knowledge contain within them the possibility of exposing structural biases with the hopes of making new, more socially just, and environmentally sound sciences, or specific

“assemblages” of diverse scientific actors, in Watson-Verran and Turnbull’s sense. That activists, or community people, can themselves produce valid, scientific knowledge is not well recognized nor seriously studied in the literature. Phil Brown’s notion of popular epidemiology is a notable exception. By popular epidemiology, Brown means “the process by which laypersons gather scientific data and other information, and also direct and marshal the knowledge and resources of experts” in order to investigate a case involving toxic contamination.³³ Popular epidemiology, unlike traditional epidemiology, cites social structures of class, race and gender, as part of the causal chain of events in the destructive impacts of toxic contamination. Brown explains:

Many people who live at risk because of toxic hazards have access to data otherwise inaccessible to scientists. Their experiential knowledge usually precedes official and scientific awareness, largely because it is tied to the labor and domestic care of everyday life. Whether or not the health hazards in communities and workplaces are due to toxic substances, discovery most often stems from lay observation.³⁴

He argues that many activists working on health and environmental issues seek to become popular scientists by conducting community health surveys, documenting observational data, hypothesizing connections with other neighborhoods and communities with similar toxic parameters, researching the existing literature, and producing documentation and reports to use in the policy or litigation process. In other words, activists actually produce reliable and systematized knowledge about the environment, much of which can be extended to or generalized to other contexts. Newman and CCAEJ compiled a document titled “Communities at Risk: Contaminated Communities Speak Out on Superfund,” which chronicles activists’ interventions in Superfund reform efforts in twenty-one states and thirty-five contaminated sites. In the report, activists outline in great detail numerous proposals for collaborative work between community and environmental scientists and medical professionals. These include projects such as conducting collaborative health surveys, staffing health clinics, evaluating hazard assessment research protocols, and researching innovative cleanup and safe disposal technologies available around the world.³⁵ In this sense, such locally generated knowledge cannot be dismissed as “merely” experiential.

The women activists I interviewed produced theories and critiques of science and the scientific expert in a number of ways and in doing so repositioned themselves from the identity of passive, ignorant victims to one of authoritative, community-based experts. For instance, in relation to her work fighting the Stringfellow Acid Pits dumping site, Newman discusses the common sense

epistemology that she and her organization adopted when dealing with attempts by health officials to trivialize their lack of technical expertise:

This stuff really wasn't that complicated. Knowing that you had DDT, TCE, and PCB flowing through the school yard, and that it's bad stuff, you didn't need more than that. One thing that the agencies never used was common sense. Most of the general public relates to common sense. When the agencies called you hysterical, the public would say, "wait a minute, what they're saying makes sense."³⁶

Often, the scientist's professional opinions appeared to fly in the face of activists' reality. Common sense would dictate that there were visible health effects, that there was clear evidence of contamination, and that there were strong indicators that the two were related. A common strategy used by many organizations, including Newman's, was the attempt to cut through the expert's rhetorical devices and to pose straightforward yes or no questions that would simplify the issue and ground it in a common sense that "any human would have to respond to." Would you be willing to live here? Would you accept a glass of water to drink? Would you want your children to play here?

Robin Cannon, a member of Concerned Citizens of South Central Los Angeles, explained that an organizing tool her group used was to bring the scientist to the community. The theory was that common sense would prevail if the authorities could see the impact with their own eyes, "that on a given block in Arizona, and out of twenty-seven households, at least one person in each household has a case of cancer and a baby has been born without a brain; it becomes difficult to say that doesn't happen and we can't do anything about it."³⁷

In some instances, the arguments and the critiques of scientific research mobilized by women activists have worked strategically to raise suspicion about an expert's belief in his or her own knowledge claims. For example, Dana Alston, from the Public Welfare Foundation, explained how she and other activists were able to convince the head of the National Institute of Environmental Health Science (NIEHS) that the standard health assessment protocols were flawed. By taking him to the house of one woman activist who lived in Louisiana's "Cancer Alley," they demonstrated that the traditional method of single chemical testing could not account for the toxic stew that many communities were living in. Just looking out this woman's kitchen windows at the assortment of industrial stacks belching plumes of black and brown smoke made it clear to him that "the one chemical exposure model was just ridiculous. Now he says that they have to go back to the very basic science where they were twenty-five years ago when they were trying to figure out how to test for one chemical."³⁸

Women environmental justice activists, therefore, engage in serious critiques of science in their challenges of the value neutrality of scientific evidence. Newman uses her firsthand knowledge about the supposedly objective technocratic rationality that governs much decision making around issues of the risks of hazardous substances to critique the environmental discourse of “acceptable risk”:

When we allow discussions about an “acceptable risk” of 1 in 1,000 or 1 in 10,000 we are accepting that it is all right to kill one person in every 1,000 or 10,000. We have allowed the premise to be that it is all right for an additional person to die so that a facility can operate. These calculations are made for each individual chemical under perfect operating conditions. No calculations are made for the effects of people being exposed to two or more chemicals simultaneously, and of course the “kill rate” increases during accidents or “illegal” discharges. The law permits corporations to kill as long as they stay within set limits.³⁹

In the process of her research on these scientifically devised industrial standards, she discovered that women and children are not considered in calculations of acceptable risk. She learned that these calculations are determined by the Centers for Disease Control and other local health departments and “are based on occupational exposures for healthy males working an 8-hour day, 5 days a week, wearing safety equipment in controlled settings.” In many low-income communities, specifically communities of color located near toxic sites, “children, pregnant women and the elderly are often exposed for 24 hours a day, 7 days a week with no protective clothing.”⁴⁰ Newman’s political strategy, therefore, incorporates the effects of environmental racism in low-income communities of color simultaneously with an analysis of the differential impact of toxic exposure on women, children, and the elderly. This complex analysis of race, class, gender, age, and pollution is very different from an appeal to “self-evident” common sense.

In India, the divide between lay and professional knowledge systems was generally not represented in such polarizing terms because many Indian women activists are themselves medical or scientific experts from a variety of disciplines—medicine, public health, social work, environmental economics. Their work focused on community organizing to create alternative forms of environmental expertise in marginalized communities of the downtrodden castes in urban slums and rural villages. For example, the organization Social Action for Rural and Tribal Inhabitants of India (SARTHI) works in tribal areas in Gujarat to develop a community-based, woman-centered model for women’s health at the primary health care level.

According to Renu Khanna, one of the social workers who founded the project, "Women's health must include issues of gynecology, psychological health, issues of violence and exploitation, and issues of decent livelihood, which includes economic and environmental justice."⁴¹ SARTHI's methods focus on elucidating tribal women's experiences and helping them to understand how they are situated in a broader social and cultural sphere that extends beyond their immediate environment. Demystification and access to knowledge are seen as the route to empowerment for tribal women, and this includes articulating their own experiential knowledge, together with both traditional and scientific expertises:

The women's health programme is conceived of as part of a larger women's programme aimed at empowerment of local women—empowerment understood as enabling the women to analyze their own situation, to decide their priorities and develop solutions to their problems and take collective action to improve various aspects of their lives. . . . SARTHI believes that whenever possible, people's traditions should be built upon rather than bypassed. For this reason, the women's health program attempts to integrate the traditional health practices with elements of the modern, allopathic medical system.⁴²

Indian women's community health is based on soliciting the local *dais*, or traditional health workers, for a training program that works to research the nature and extent of local women's health problems and to incorporate both folk and scientific medical knowledges. The political project is to develop a strong base of local women's health workers who understand the multiple levels that affect women's health—physiological, social, cultural, and environmental. This includes national and international networking strategies to attract many people with different levels of technical expertise who would be interested in constructing alternative models of health care, environmental awareness, and community development.

Thelma Narayan, an epidemiologist who works for the Community Health Cell (CHC) in Bangalore, also works to challenge and transform traditional scientific constructions of health and environmental expertise. The CHC defines community health in much broader terms than does the official government version, which is generally limited to immunization programs, antidiarrheal dispensaries, and family planning initiatives. Some of the health issues that the CHC targets include women's health and the population debates, environmental health problems such as those caused by the Bhopal incident, girl child survival and health, and urban slum health concerns, including sanitation, water, and housing.

Narayan is also an active member of the Medico Friends Circle (MFC), an Indian analogue to the U.S.-based Physicians for Social Responsibility. MFC activists work with village women throughout India to devise participatory research methods to determine the environmental health needs of the community. These

women activists design innovative health surveys using the government's survey instruments to uncover important information that otherwise remains invisible. According to Narayan, "Many of these activists-cum-researchers are recognized even by the government for their knowledge."⁴³

The MFC and the CHC align themselves with the Indian people's science movement, popularly known as the KSSP (Kerala Sastra Sahithya Parishat). The KSSP, most active in the states of Kerala and West Bengal, believes that "science is a powerful tool for social conscientization and transformation."⁴⁴ People's science activists link campaigns against drought, deforestation, and industrial hazards to the class and caste struggles of the rural poor and employ science as the means to articulate these seemingly unrelated matters. Translocal alliances, or contact zones, are formed among villagers, scientists, local government personnel, and NGO representatives from different countries to exchange technical knowledge about ecology, health, and water sanitation, and to develop social analyses to help local people to generate political strategies.

Local and global contact zones are forged in both the United States and India through the articulation of new forms of environmental expertise. Indian activists, however, often have greater access to professional scientists and researchers due to the persistence of a Gandhian social service ideology and the existence of a well-respected people's science movement. The gap between the legitimacy of local people's knowledge and scientific knowledge is, therefore, usually wider in the United States, explaining many U.S. activists' experiences of feeling betrayed by the scientific establishment.

U.S. epidemiologists, for example, are less likely than doctors such as Narayan to devote their lives to working for the poor, or for those communities that are suffering from toxic contamination. In fact, for many medical professionals and epidemiologists in the United States, it becomes a dangerous enterprise to testify on behalf of a toxic-damaged community.⁴⁵ According to some activists and scholars, some reasons for this include the strong "cult of the expert" in the United States, the power of the corporate sector, the lack of a national health care plan, and a medical establishment beholden to the insurance companies.⁴⁶ The strategies for the development of popular epidemiology deployed by U.S. environmental and health activists, therefore, more often than in India, incorporate a sustained critique of official environmental and health sciences and usually an analysis of scientists' collusion with corporate and government interests.

Critiques and Constructs in the Formation of Environmental Expertise

As part of their organizing strategy, women in the U.S. environmental justice movement *critique* existing environmental impact reports and epidemiological

research methods and *construct* alternative models to counter what they argue is the profusion of environmental health assessment research that is “inconclusive by design.” Activists critically interrogate standards of proof, research questions posed, and data interpretation based on standard conventions gauging statistical significance. They have argued that environmental health protocols ask the wrong questions or are not directed toward investigations that would provide relevant information to communities.

One of the most crucial deficiencies that activists have noted in traditional epidemiological studies is the practice of studying single-source contamination. Most community activists are concerned with the synergistic effects of multiple-source contamination since most polluted communities have to contend with a toxic stew of hazardous emissions rather than exposure to one chemical at a time. Cannon explains:

We wanted to know not only what the long-term effects would be, we asked for what some of the short-term impacts would be, this was something that no one else had ever gotten. We wanted to know what some of the synergistic impacts would be, so when you have mercury and lead combined, what kinds of things do you create and what can they do. We wanted to know about the compound impacts of chemicals, if we have this much lead in our bodies this year and this much next year, ten years down the line when I have so much lead in my body and I have a heart attack, could it have been a contributor? We were able to get a multi-ethnic panel of scientists of our own who were saying, this is what this community needs to know.⁴⁷

Productive partnerships and new alliances between grassroots organizations and the scientific/medical establishment are able to emerge as activists shore themselves up with scientific, legal, corporate, economic, and legislative expertise. These diverse assemblages produce a form of “strong objectivity” that mobilizes multiple knowledge production practices, including those of experiential common sense and experimental science. The biases, partiality, and situatedness of the different practices and actors become part of the epistemological framework—not that which must be expunged in order to get at the truth. Feminist science critic and theoretical physicist Karen Barad has theorized a similar perspective engaging the notion of scientific objectivity using the concept “agential realism”: the necessary assignation of *agency*, and thus social and cultural specificity, to the human actors (scientists) posing questions about natural phenomena. She argues:

According to agential realism, it is the very fact that scientific knowledge is socially constructed that leads to reliable knowledge about “the between,” our intra-actions with nature, which is just what we are interested in. That is, the usefulness of science is parasitic on the intra-actions of science and society,

contrary to the Enlightenment insistence that its justification and reliability depend precisely on a strict division between the two. Reproducibility is not a filter for shared biases. Scientific methodologies can offer empirically adequate theories of the physical world even though the theories are methodologically, conceptually, and institutionally allied with specific social and political agendas.⁴⁸

Resource and training organizations, such as Citizen's Clearinghouse for Hazardous Waste (CCHW), the Southwest Network's "grassroots training institute," and the CCAEJ, offer community groups technical assistance, leadership training, and organizational development, occasionally in collaboration with scientific allies who, intentionally or not, foster agential realism. Women in the movement who had little or no scientific education, or confidence in learning it, have become empowered by developing a certain fluency in scientific discourse and in the environmental health policy process. Such increased levels of organizational sophistication and expertise seriously counter the credentialed expert opinions of social research institutes such as Cerrell and Associates, who provide the state of California and private corporations with sociological criteria for targeting communities that are "least likely to resist" the incursion of potentially dangerous industries.⁴⁹

Has this expansion of environmental expertise in the form of popular epidemiology had any impact on the environmental health establishment? Linda King, the director of the Environmental Health Network, located in Chesapeake, Virginia, argues that environmental and health activists are "changing the science of epidemiology" by "reshaping how information is collected" through their "critiques of how science looks at toxic-damaged communities."⁵⁰ In the document, *Inconclusive by Design: Waste, Fraud, and Abuse in Federal Environmental Health Research*, King and other activists detail how both government and industry have concealed crucial information about the toxicity of certain chemicals and how communities have been systematically misled about the dangers of exposure to these chemicals.⁵¹

The critique of the science of standard epidemiology that emerges from this study develops a popular epidemiology that has the potential to begin to link health disorders and symptoms to environmental hazards located in a community. Popular epidemiology, unlike traditional epidemiology, which usually conducts general reviews of health disorders, takes into account the physiological, psychological, and social effects of environmental hazards and attempts to show how racial, class, and gender differences are evident in the health effects of environmental toxic exposure. King argues that standard environmental health assessments are not designed to understand local cultures, traditions, or ethnic

backgrounds and so are ineffective in identifying potential routes of toxic exposure, nor do they take into account demographic dislocations. She writes:

Classic epidemiology does not look at the Afro-American or Hispanic American extended family system. Nor does it account for small or rural towns, where cancer may be diagnosed and treated out of the state. It does not look at the mobility of populations today. Classic epidemiology does not include in its study design the history of a family or of a town to assess how they have been affected by non-related health, stress, or economic factors. It also fails to examine the knowledge that local populations possess regarding their own health and well-being.⁵²

The community health survey has become one of the most important components of activists' work helping them to construct a new form of environmental expertise. King argues that, unlike traditional epidemiological surveys, her organization designs surveys, such as the Symptom Survey, to meet the information needs of a particular toxic-damaged community. Local activists study the patterns and concentrations of health disorders suspected to be linked with community environmental and workplace hazards. The community health survey draws attention to concentrations and clusters of certain disorders, such as cancers, miscarriages, or deformities, and may be used to pressure government officials, public health professionals, and private industry to respond to the health concerns of the residents. In their research, activists engage in a process of linking traditional scientific practices with more narrative approaches: Their health surveys often make use of sampling techniques, lab testing, and mapping of suspected pollutants *together with* experiential narratives of the effects of toxic pollutants on the body and on their local environments.

Some alliances linking both popular epidemiology and more traditional scientific methods have emerged.⁵³ The CCHW, located in the Washington, D.C., area, offers technical assistance and consultation, reviews detailed technical reports and risk assessment of hazardous waste sites, conducts educational workshops for activists, and provides information about private corporations and technologies for thousands of community environmental justice groups across the country. In their recent campaign against dioxin, the CCHW has published a book, *Dying From Dioxin: A Citizen's Guide to Reclaiming our Health and Rebuilding Democracy*, which provides accessible information on the history of dioxin contamination and government cover-ups, the science of dioxin and its health effects, and practical help for communities to begin to organize against further dioxin poisoning.⁵⁴

The Louisiana Environmental Action Network and the Virginia based Environmental Health Network also maintain resources and files on community

health surveys and epidemiological research for community activists. Importantly, they also hold workshops for local physicians, educating them about symptoms to be attentive to that are specific to occupational and environmental health problems. The Environmental Health Network's Health Intervention Program is intended to help affected communities obtain adequate health services by generating clinical data on chemical and radiation exposures that can aid in understanding the emergence of environmentally related disease patterns. This information can then be used to lobby for health services, to establish preventive programs, to educate medical professionals about environmental illness, and to reduce or eliminate toxic exposures.

King explains that this activist program is transnational in scope; she has successfully worked with activists in Canada to persuade the Canadian Health Ministry to fund partially the Health Intervention Program in order to serve the radiation-damaged community of Port Hope, Ontario. In addition, King has traveled to the former Soviet Union, meeting with numerous minority communities suffering from what she referred to as "unimaginable" diseases and deformities from radiation, dioxin, and heavy metals poisoning. She is consulting with them to develop strategies to organize for health services and toxic waste cleanup in the newly independent states.

The Toxics Risk Inventory (TRI), a database developed by the Right to Know Network, allows communities to map out and to educate themselves about the polluting facilities in the area, the toxicity of the chemicals the facility emits, and the risks of exposure to those chemicals. By systematically documenting and tracking disease patterns in communities where there are so-called low-level exposures to toxic chemicals, many of these regional and national networks are able to focus on civil rights violations in the enforcement of federal, state, and local environmental regulatory statutes and also to record inequities and governmental neglect of particular communities' environmental health rights. For example, King explained how her organization assisted the residents of St. Gabriel, Louisiana, a toxic-damaged community that was interested in surveying what they considered to be extremely high incidences of miscarriages. When the federal Agency for Toxics Substances and Disease Registry's (ATSDR) health survey, which uses the method of averaging the total yearly miscarriages in a sample population, found no "statistically significant differences," the community wanted to conduct a parallel survey. The Network compared the TRI data documenting incidences of toxic spills, explosions, and leaks from local factories with the numbers of miscarriages that occurred during those periods. By disaggregating the numbers, rather than relying on an average, they were able to demonstrate a correspondence between rate of miscarriage and increased toxic exposure.

The popular epidemiology practiced by these women activists offers a new path to scientific inquiry that bridges epistemological and methodological approaches and provides channels, albeit contentious ones, to bring scientists and activists together in a more interactive knowledge production practice. This is actually a process, not only of collaborating, but also of constructing a new scientific practice—one that takes different standpoints, different forms of expertise, and social justice arguments into account.

Conclusion: “The Truth Won’t Set You Free, But Organizing Will”⁵⁵

Women activists in the United States and India develop knowledge about serious environmental and health problems to get at the “truth” of how transnational economic, scientific, and environmental forces impact their lives. For many women, knowledge production is a critical stage of self-empowerment helping them to understand their positioning in larger sociocultural and political economic systems. For others, environmental and health knowledge is an essential, yet contested, resource that must be struggled for in the political arena. Environmental expertise and its relative political effectiveness is what is at stake.

Transnational environmental practices materialize from the travel of ideas, strategies, political networks, and from the real lives of women themselves. These transnational flows of knowledges, technologies, and people move through various channels, resulting in the production, reception, consumption, transformation, articulation, and exchange of knowledges and resources in relation to the environment, health, and development. The production and exchange of these knowledges has sometimes served to create local and global visions that counter the “New World Order” discourses.

Such local/global visions and exchanges often are productive of translocal solidarities and alliances among women (and men) situated very differently in the world. Negotiating these differences, as the women’s experiences from India and the United States have shown, requires a politics of articulation based upon a serious engagement with multiply situated environmental, health, and scientific knowledges. Producing a range of theoretical and methodological constructs, from grassroots to elite, the words of the women I interviewed begin to paint a picture of the various forms of organization and practices of connection that I see as central to the transnational environmentalist feminist field. As many women activists insisted, however, knowledge is just one component of environmental expertise. The most rigorously researched community health survey only gets you so far; the truth about toxic exposure and illness must be seen as part of a larger political strategy. The development of a critical transnational feminist environmentalist analysis would require greater attention to the situated knowledges

and organizational strategies that are produced within marginalized sites of environmental knowledge production—in the United States, those of low-income and minority communities affected by toxic pollution, and in India, those of poor, low-caste village and slum-dwelling communities whose livelihoods are directly threatened by environmental deterioration.

Activists in the U.S. environmental justice movement have made conceptual innovations linking environmental and health concerns by insisting on a broader conception of the environment to articulate issues of community sustainability, health, and well-being with more traditional concerns of environmental protection. They have also attempted to construct a new conception of the idea of community and what it means to organize for social and environmental justice for diverse communities. Although activists speak about commitments to their local communities, they do not necessarily confine themselves to a localist, or NIMBY, framework. As environmental justice groups have developed a consciousness of being part of a larger movement, even an international one linking together larger historical trends of environmental injustice, they have tended to raise issues that go beyond the hazards posed by local dumps or incinerators. Women environmental activists in the United States and India situate themselves within a long history of local and global environmental health injustices and append their own predicaments to the growing international inventory: Minamata, Japan; Seveso, Italy; Mannheim, West Germany; Chernobyl, USSR; Bhopal, India; Love Canal, New York; Times Beach, Missouri. These are chronicles of the terrible effects of global visions “from above.”

In order to engage in cross-cultural dialogue about environmental, economic, and social transitions, and to envision effective forms of transcommunal and transnational environmentalism, I think we must be attentive to the many different social histories and critical knowledges for understanding human health and environment relationships. This requires a diversification and reconstruction of the concept of environmental expertise. Popular epidemiology and the struggle for community health in the transnational movement for environmental justice construct innovative models of transcommunal environmental expertise. The new models provide a voice for low-income and minority groups to be represented in the debates about how best to solve environmental problems.

Finally, the common perception that *international* environmental organizations are concerned with “global environmental change” and *grassroots* environmental organizations limit themselves to local issues is an increasingly inaccurate formulation. Local environmental groups privilege concerns of environmental injustice, yet are developing strategies that build transcommunal and transnational alliances. Many groups are *re*-defining what counts as global environmental change

and are discursively constructing alternative global visions. These formulations are all in opposition to the totalizing impulses of the New World Order discourses and, at the same time, refuse the easy separation of local and global. They insist upon, I think, approaches to confronting global environmental change that rely upon many diverse forms of environmental knowledge and expertise—from scientific to community-based—and on organizing strategies that are committed to shaping new, transcommunal versions of global solidarity.

Notes

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1. See Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement* (Washington, D.C.: Island Press, 1993); and Christopher Sellars, *Hazards of the Job: From Industrial Disease to Environmental Health Science* (Chapel Hill: University of North Carolina Press, 1997).
2. For example, see Vandana Shiva, ed., *Close to Home: Women Reconnect Ecology, Health, and Development Worldwide* (Philadelphia: New Society Publishers, 1994).
3. Peter Taylor and Frederick Buttel, "How Do We Know We Have Global Environmental Problems?" *Geoforum* 23:3 (1992): 405–16.
4. Wolfgang Sachs, "Global Ecology and Shadow of 'Development,'" in *Global Ecology: A New Arena of Political Conflict*, ed. Wolfgang Sachs (London: Zed Books, 1993); Nicholas Hildyard, "Foxes in Charge of the Chickens," in Sachs, *Global Ecology*; and Robyn Eckersley, *Environmentalism and Political Theory* (Albany, N.Y.: SUNY, 1992).
5. For example, Paul Ehrlich, *The Population Bomb* (London: Pan/Ballantine, 1972); and Donella Meadows, Dennis Meadows, Jorgen Randers, and William Behrens III, *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind* (New York: Universe, 1972).
6. Taylor and Buttel, "How Do We Know"; Sachs, *Global Ecology*; Anil Agarwal and Sunita Narain, *Global Warming in an Unequal World: A Case of Environmental Colonialism* (New Delhi: Centre for Science and Environment, 1991); and Tom Athanasiou, *Divided Planet: The Ecology of Rich and Poor* (New York: Little Brown & Co., 1996).
7. For accounts of the history, theory, and practice of the environmental justice movement, see Richard Hofrichter, ed., *Toxic Struggles: The Theory and Practice of Environmental Justice* (Philadelphia: New Society Press, 1993); Giovanna Di Chiro, "Defining Environmental Justice: Women's Voices and Grassroots Politics," *Socialist Review* 22:4 (1992): 93–130, and "Nature as Community: The Convergence of Environment and Social Justice," in *Uncommon Ground: Toward Reinventing Nature*, ed.

- William Cronon (New York: W.W. Norton, 1995); Robert Bullard, ed., *Unequal Protection: Environmental Justice and Communities of Color* (San Francisco: Sierra Club Books, 1994), and *Confronting Environmental Racism: Voices From the Grassroots* (Boston: South End Press, 1993); and Bunyan Bryant, *Environmental Justice: Issues, Policies, and Solutions* (Washington, D.C.: Island Press, 1995).
8. Bina Agarwal, "The Gender and Environment Debate: Lessons from India," *Feminist Studies* 18:1 (1992): 119–58; Meera Nanda, "Is Modern Science a Western, Patriarchal Myth? A Critique of the Populist Orthodoxy," *South Asia Bulletin* 11:1–2 (1991): 32–61; Gail Omvedt, *Reinventing Revolution: New Social Movements and the Socialist Tradition in India* (Armonk, N.Y.: Sharpe, 1993); Cecile Jackson, "Radical Environmental Myths: A Gender Perspective," *New Left Review* 210 (March/April 1995), 124–40; C. Jackson, "Women/Nature or Gender/History? A Critique of Ecofeminist 'Development,'" *The Journal of Peasant Studies* 20:3 (1993): 389–419; Maria Mies and Vandana Shiva, *Ecofeminsm* (London: Zed Books, 1993); Rosi Braidotti, Ewa Charkiewicz, Sabine Hausler, and Saskia Wieringa, eds., *Women, the Environment and Sustainable Development* (London: Zed Books, 1994); and Wendy Harcourt, ed., *Feminist Perspectives on Sustainable Development* (London: Zed Books, 1994).
 9. Arguments for preserving biodiversity to sustain the global genetic pool are put forth by Michael E. Soulé, ed. *Conservation Biology: The Science of Scarcity and Diversity* (Sunderland, Mass.: Sinauer Associates, 1986); and Edward Grumbine, *Ghost Bears: Exploring the Biodiversity Crisis* (Washington, D.C.: Island Press, 1992). The key texts arguing for the preservation of biodiversity to protect species for their potential future use as resources in the pharmaceutical, agricultural, chemical, or other industries are *Global Biodiversity Strategy* (Washington, D.C.: WRI-IUCN-UNEP, 1991) and the Biodiversity platform produced at UNCED in Brazil in 1992.
 10. The presence of the headquarters of the Indian office of the transnational seed and grain trader, Cargill, mobilized hundreds of South Indian farmers into political action against the corporation's international efforts to patent indigenous seed varieties. Local farmers have banded together with indigenous agricultural rights organizations, such as NAVDANYA, located in Bangalore, to contest international intellectual property rights law. See Vandana Shiva, "Farmer's Rights, Biodiversity and International Treaties," *Economic and Political Weekly* 28:14 (April 3, 1993): 555–60, "The Seed and the Earth: Biotechnology and the Colonisation of Regeneration," *Development Dialogue* 1:2 (1992): 151–68, and "Biotechnology Development and Conservation of Biodiversity," *Economic and Political Weekly* 26:48 (1991): 2740–46; and Mridula Udayagiri, "Dunkel, Cargill, and Kentucky Fried Chicken: Farmer's Protests Against Free Trade and Multinationals in Karnataka, India" (paper presented at the Conference of the International Sociological Association, Globalization and Collective Action: Strategies and Prospects for Oppositional Politics, University of California, Santa Cruz, May 17–19, 1996).
 11. Many of these alliances are built through women's international networks. Internationally, the awareness of women's connections to the environment and to the

sustenance of natural resources and daily life has flourished in various intellectual and activist domains. International nongovernmental organizations (NGOs), which concentrate on issues such as women and development, women and population, women and human rights, and women and health, have emerged with a certain amount of legitimacy within the international relations/policy scene (for example, Women's Environment and Development Organization [WEDO]-U.S.A., Development Alternatives with Women for a New Era [DAWN]-Barbados, Women's Environmental Network-U.K., International Policy Action Committee [IPAC]-Brazil, and ISIS International, Philippines). In the United States, women's particular interests in the environment and health can be seen in the evolving coalition of environmental and women's health organizations that are developing projects examining the environmental causes of breast cancer in women (for example, National Women's Health Network-Washington, D.C., Women's Community Cancer Project-Boston, Long Island Breast Cancer Action Coalition, and Breast Cancer Action-San Francisco). See Noël Sturgeon, *Ecofeminist Natures: Gender, Race, Feminist Theory, and Environmental Action* (New York: Routledge, 1997) for a critical, yet sympathetic, analysis of national and international ecofeminist theories and practices.

12. Arturo Escobar, "Cultural Politics and Biological Diversity: State, Capital, and Social Movements in the Pacific Coast of Columbia" (unpublished manuscript, 1996), 15.
13. Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992).
14. Inderpal Grewal and Caren Kaplan, eds., *Scattered Hegemonies: Postmodernity and Transnational Feminist Practices* (Minneapolis: University of Minnesota Press, 1994).
15. See "Dumping 'Waste' on Third World Countries: What Can We Do About It?" (Philippine Action Group for the Environment, 1631 Ballard Street, Carson, Calif. 90745 and Center for Community Action and Environmental Justice, 2730 Wilshire Blvd., Santa Monica, Calif. 90403, 1994).
16. Philomena Vincent, AIKYA, interview by author, Bangalore, August 5, 1993.
17. The establishment in 1994 of the EPA's National Environmental Justice Advisory Committee (NEJAC) is an exception to this, and it has empaneled some environmental justice activists to examine the problem of disproportionate impact of hazardous pollutants on minority populations. These activist/advisors, however, are not in the position to seriously impact national R&D policy.
18. Michael E. Soulé and Gary Lease, eds., *Reinventing Nature?: Responses to Postmodern Deconstruction* (Washington, D.C.: Island Press, 1995), 138.
19. George Sessions, "Reinventing Nature? The End of Wilderness?" *Wild Earth* 6:4 (winter 1996/97): 46–48.
20. For a similar argument relating to activist interventions in the AIDS epidemic and the medical sciences, see Steven Epstein, "The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials," *Science, Technology, & Human Values* 20:4 (autumn 1995): 408–37, "Democratic Science?

- AIDS Activism and the Contested Construction of Knowledge,” *Socialist Review* 21:2 (April–June 1991): 35–64, and *Impure Science: AIDS, Activism, and the Politics of Knowledge* (Berkeley: University of California Press, 1996).
21. Anthropologist Renato Rosaldo has made the same argument in *Culture and Truth: The Remaking of Social Analysis* (Boston: Beacon Press, 1993). In the area of cultural studies, see John Fiske, “Cultural Studies and the Culture of Everyday Life,” in *Cultural Studies*, ed. Lawrence Grossberg, Cary Nelson, and Paula Treichler (New York: Routledge, 1992), 154–73.
 22. For in-depth analyses of this evolution in the critical study of science and technology, see Andrew Pickering, *Science as Practice and Culture* (Chicago: University of Chicago Press, 1992); Joseph Rouse “What are Cultural Studies of Scientific Knowledge?” *Configurations* 1:1 (1991): 1–22; and Sharon Traweek, “An Introduction to Cultural and Social Studies of Sciences and Technologies,” *Culture, Medicine and Psychiatry* 17 (1993): 3–25.
 23. The branch of science studies that foregrounds the nonexpert, ordinary sites of the construction and re-construction of scientific knowledges and technologies, what David Hess has called “critical STS,” is less coherent and, at this time, is rather underdeveloped. See David Hess, “If You’re Thinking of Living in STS . . . A Guide for the Perplexed,” in *Cyborgs and Citadels: Anthropological Interventions on the Borderlands of Technoscience*, ed. Gary Downes, Joseph Dumit, and Sharon Traweek (Seattle: University of Washington Press, 1995).
 24. A very similar approach to technoscience studies is found in David Hess’s book, *Science and Technology in a Multicultural World: The Cultural Politics of Facts and Artifacts* (New York: Columbia University Press, 1995).
 25. “God trick” is Donna Haraway’s term referring to the belief that scientific objectivity is that which emerges from a value-free, impartial, dispassionate vision—the vision from everywhere and nowhere in particular. See Donna Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,” *Feminist Studies* 14:3 (1977): 575–99.
 26. Sandra Harding, *Whose Science? Whose Knowledge? Thinking from Women’s Lives* (Ithaca: Cornell University Press, 1991), 31, 52, 53. See also, M. Jacqui Alexander and Chandra Monhanty, eds., *Feminist Genealogies, Colonial Legacies, Democratic Futures* (New York: Routledge, 1997).
 27. Susan Leigh Star, “Power, Technology, and the Phenomenology of Conventions: On Being Allergic to Onions,” in *A Sociology of Monsters? Power, Technology, and the Modern World*, ed. John Law, *Sociological Review Monographs*, no. 38 (Oxford: Basil, 1991).
 28. Harding, *Whose Science? Whose Knowledge?*
 29. See, for example, Nicholas Freudenberg, *Not in Our Backyards!: Community Action for Health and the Environment* (New York: Monthly Review Press, 1984); Celene Krauss, “Community Struggles and the Shaping of Democratic Consciousness,” *Sociological Forum* 4:2 (1989): 227–39; Thomas Dietz, Paul Stern, and Robert Rycroft,

- "Definitions of Conflict and the Legitimation of Resources: The Case of Environmental Risk," *Sociological Forum* 4:1 (1989): 47–71; Stephen Couch and J. Stephen Kroll-Smith, *Communities at Risk: Collective Responses to Technological Hazards* (New York: Peter Lang, 1991); Phil Brown and Edwin Mikkelsen, *No Safe Place: Toxic Waste, Leukemia, and Community Action* (Berkeley: University of California Press, 1990); Stella Capek, "Environmental Justice, Regulation and the Local Community," *International Journal of Health Services* 22 (1992): 729–46; Susan Masterson-Allen and Phil Brown, "Public Reaction to Toxic Waste Contamination: Analysis of a Social Movement" *International Journal of Health Services* 20 (1990): 485–500; and Andrew Szasz, *Ecopopulism: Toxic Waste and the Movement for Environmental Justice* (Minneapolis: University of Minnesota Press, 1994).
30. Helen Watson-Verran and David Turnbull, "Science and Other Indigenous Knowledge Systems," in *Handbook of Science and Technology Studies*, ed. Sheila Jasanoff, Gerald Markle, James Petersen, and Trevor Pinch (Thousand Oaks, Calif.: Sage, 1995).
 31. Watson-Verran and Turnbull, "Science and Other Indigenous Knowledge Systems," 137.
 32. Watson-Verran and Turnbull, "Science and Other Indigenous Knowledge Systems," 138.
 33. Phil Brown, "Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing," *Journal of Health and Social Behavior* 33:3 (September 1992): 269.
 34. Phil Brown, "When the Public Knows Better: Popular Epidemiology Challenges the System," *Environment* 35:8 (1993): 19.
 35. Penny Newman and CCAEJ, "Communities at Risk: Contaminated Communities Speak Out on Superfund" (Riverside, Calif.: Center for Community Action and Environmental Justice, 1994).
 36. Penny Newman, member of Concerned Neighbors of Glen Avon, interview by author, Glen Avon, Calif., April 1, 1993. At the time of the interview, she was the West Coast Field Organizer for CCHW.
 37. Robin Cannon, board member and cofounder of Concerned Citizens of South Central Los Angeles, interview by author, Los Angeles, Calif., April 2, 1993.
 38. Dana Alston, interview by author, Public Welfare Foundation, Washington, D.C., December 22, 1992.
 39. Penny Newman, "The Environment: An Issue of Health, Safety and Social Justice," *Action-Gram Riverside County Department of Community Action* 8:1 (summer 1992).
 40. Newman, "The Environment: An Issue of Health."
 41. Renu Khanna, director of SARTHI, interview by author, Bangalore, India, July 15, 1993.
 42. Renu Khanna, *Taking Charge: Women's Health as Empowerment: The SARTHI Experience* (Baroda, Gujarat: SAHAJ/SARTHI, 1992), i.

43. Thelma Narayan, interview by author, Community Health Cell, Bangalore, India, August 2, 1993.
44. Voluntary Health Association of India, *State of India's Health* (New Delhi: VHA Publications, 1992), 250. The term "conscientization" was coined by the Brazilian educational theorist Paulo Freire to describe the process of formation of critical awareness in impoverished peasants experiencing his radical educational programs.
45. Linda King, director of the Environmental Health Coalition, interview by author, Chesapeake, Va., May 24, 1996.
46. Lois Marie Gibbs, *Dying From Dioxin: A Citizen's Guide to Reclaiming our Health and Rebuilding Democracy* (Boston: South End Press, 1996); Brown, "When the Public Knows Better"; Ryoichi Terada, "Changing Characteristics of Japan's Environmental Movements Since the 1970s," in *Environment and Development: A Sociological Understanding for the Better Human Conditions*, ed. Korean Sociological Association (Seoul: Seoul Press, 1994); and Sanford Lewis, Brian Keating, and Dick Russell, *Inconclusive by Design: Waste, Fraud, and Abuse in Federal Environmental Health Research* (Boston: Environmental Health Network and National Toxics Campaign Fund, 1992).
47. Cannon, interview, 1993.
48. Karen Barad, "A Feminist Approach to Teaching Quantum Physics," in *Teaching the Majority: Breaking the Gender Barrier in Science, Mathematics, and Engineering*, ed. Sue Rosser (New York: Teachers College Press, 1995), 70–71.
49. "Political Difficulties Facing Waste-to-Energy Conversion Plant Siting" (Los Angeles: Cerrell Associates, 1984). Not surprisingly, the profile of such a community looks something like the following: "least resistant: small communities, under 25,000 population; rural: employed by facility; sees significant economic benefits; conservative; free market orientation; above middle age; high school or less education; nature exploitative occupations, i.e., farmer, mining, low-income."
50. King, interview.
51. Lewis, Keating, and Russell, *Inconclusive by Design*.
52. Linda King, "Poverty and Race: Environmental Health Research and Health Care" (unpublished manuscript, Environmental Health Network, P.O. Box 16267, Chesapeake, Va. 23328-6267, 1993).
53. For a more detailed analysis of the work of these "larger than local" regional and statewide clearinghouses, see Patrick Novotny, "Popular Epidemiology and the Struggle for Community Health: Alternative Perspectives from the Environmental Justice Movement," *Capitalism, Nature, Socialism* 5:2 (June 1994): 29–42.
54. Lois Marie Gibbs, *Dying From Dioxin: A Citizen's Guide to Reclaiming our Health and Rebuilding Democracy* (Boston: South End Press, 1996), 179.
55. Gibbs, *Dying From Dioxin*.